CHAPTER 2

CARBOHYDRATES AND CARBOHYDRATE METABOLISM

1. The general formula of monosaccharides is

(A) $C_nH_{2n}O_n$ (B) $C_{2n}H_2O_n$
(C) $C_nH_2O_{2n}$ (D) $C_nH_{2n}O_{2n}$

2. The general formula of polysaccharides is

(A) $(C_6H_{10}O_5)_n$ (B) $(C_6H_{12}O_5)_n$
(C) $(C_6H_{10}O_6)_n$ (D) $(C_6H_{10}O_6)_n$

3. The aldose sugar is

(A) Glycerose (B) Ribulose
(C) Erythrulose (D) Dihydoxyacetone

4. A triose sugar is

(A) Glycerose (B) Ribose
(C) Erythrose (D) Fructose

5. A pentose sugar is

(A) Dihydroxyacetone (B) Ribulose
(C) Erythrose (D) Glucose

6. The pentose sugar present mainly in the heart muscle is

(A) Lyxose (B) Ribose
(C) Arabinose (D) Xylose

7. Polysaccharides are

(A) Polymers (B) Acids
(C) Proteins (D) Oils

8. The number of isomers of glucose is

(A) 2 (B) 4
(C) 8 (D) 16

9. Two sugars which differ from one another only in configuration around a single carbon atom are termed

(A) Epimers (B) Anomers
(C) Optical isomers (D) Stereoisomers

10. Isomers differing as a result of variations in configuration of the —OH and —H on carbon atoms 2, 3 and 4 of glucose are known as

(A) Epimers (B) Anomers
(C) Optical isomers (D) Steroisomers

11. The most important epimer of glucose is

(A) Galactose (B) Fructose
(C) Arabinose (D) Xylose

12. α-D-glucose and β -D-glucose are

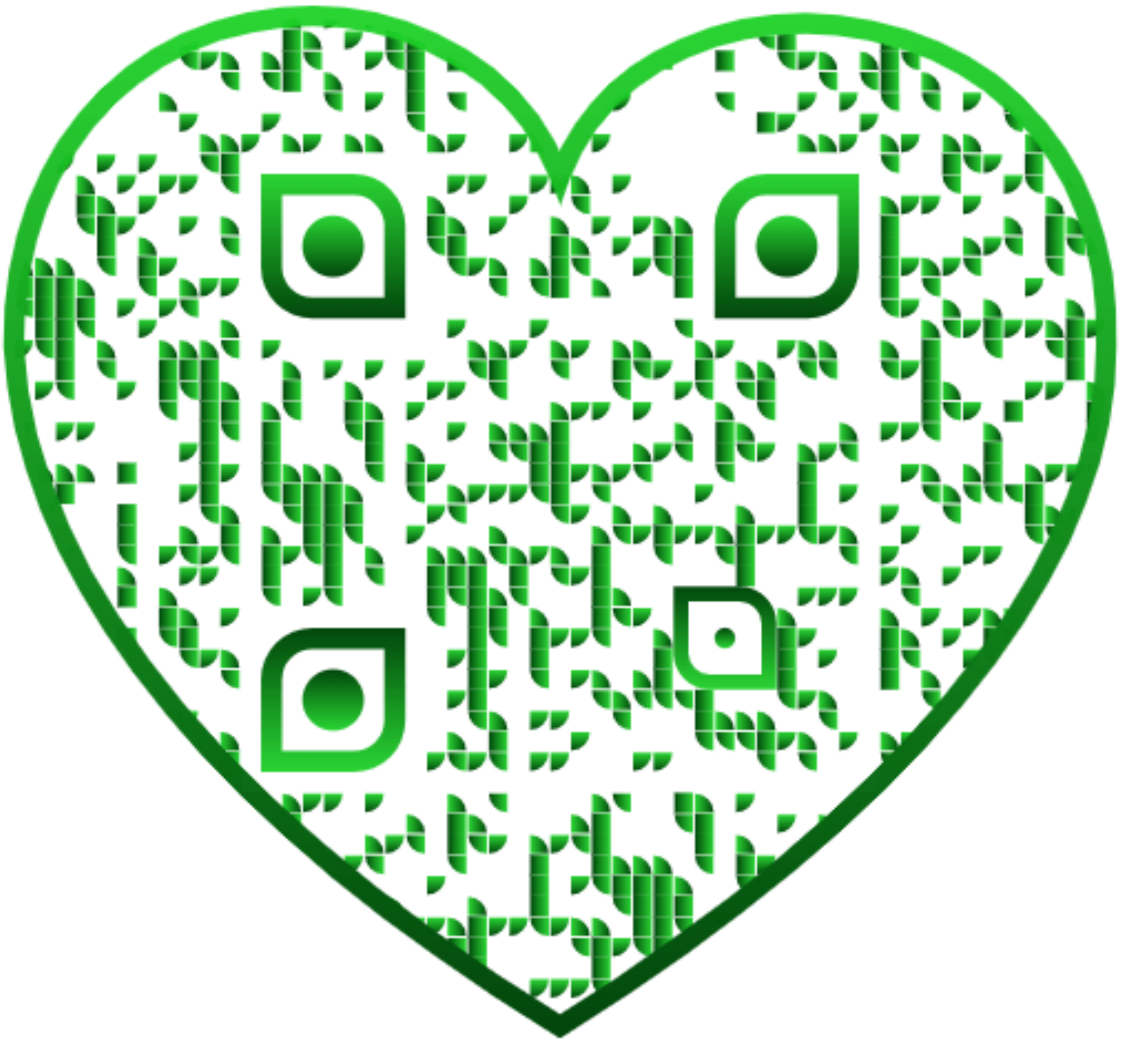
(A) Stereoisomers (B) Epimers
(C) Anomers (D) Keto-aldo pairs

13. α-D-glucose + $112^0 \rightarrow$ + $52.5^0 \leftarrow$ + 19^0 β-D-glucose for glucose above represents

(A) Optical isomerism (B) Mutarotation
(C) Epimerisation (D) D and L isomerism

14. Compounds having the same structural formula but differing in spatial configuration are known as

(A) Stereoisomers (B) Anomers
(C) Optical isomers (D) Epimers



15. In glucose the orientation of the —H and —OH groups around the carbon atom 5 adjacent to the terminal primary alcohol carbon determines

(A) D or L series
(B) Dextro or levorotatory
(C) α and β anomers
(D) Epimers

16. The carbohydrate of the blood group substances is

(A) Sucrose (B) Fucose
(C) Arabinose (D) Maltose

17. Erythromycin contains

(A) Dimethyl amino sugar
(B) Trimethyl amino sugar
(C) Sterol and sugar
(D) Glycerol and sugar

18. A sugar alcohol is

(A) Mannitol (B) Trehalose
(C) Xylulose (D) Arabinose

19. The major sugar of insect hemolymph is

(A) Glycogen (B) Pectin
(C) Trehalose (D) Sucrose

20. The sugar found in DNA is

(A) Xylose (B) Ribose
(C) Deoxyribose (D) Ribulose

21. The sugar found in RNA is

(A) Ribose (B) Deoxyribose
(C) Ribulose (D) Erythrose

22. The sugar found in milk is

(A) Galactose (B) Glucose
(C) Fructose (D) Lactose

23. Invert sugar is

(A) Lactose (B) Sucrose
(C) Hydrolytic products of sucrose
(D) Fructose

24. Sucrose consists of

(A) Glucose + glucose
(B) Glucose + fructose
(C) Glucose + galactose
(D) Glucose + mannose

25. The monosaccharide units are linked by $1 \rightarrow 4$ glycosidic linkage in

(A) Maltose (B) Sucrose
(C) Cellulose (D) Cellobiose

26. Which of the following is a non-reducing sugar?

(A) Isomaltose (B) Maltose
(C) Lactose (D) Trehalose

27. Which of the following is a reducing sugar?

(A) Sucrose (B) Trehalose
(C) Isomaltose (D) Agar

28. A dissaccharide formed by 1,1-glycosidic linkage between their monosaccharide units is

(A) Lactose (B) Maltose
(C) Trehalose (D) Sucrose

29. A dissaccharide formed by 1,1-glycosidic linkage between their monosaccharide units is

(A) Lactose (B) Maltose
(C) Trehalose (D) Sucrose

30. Mutarotation refers to change in

(A) pH (B) Optical rotation
(C) Conductance (D) Chemical properties

31. A polysacchharide which is often called animal starch is

(A) Glycogen (B) Starch
(C) Inulin (D) Dextrin

32. The homopolysaccharide used for intravenous infusion as plasma substitute is

(A) Agar (B) Inulin
(C) Pectin (D) Starch

33. The polysaccharide used in assessing the glomerular fittration rate (GFR) is

(A) Glycogen (B) Agar
(C) Inulin (D) Hyaluronic acid

34. The constituent unit of inulin is

(A) Glucose (B) Fructose
(C) Mannose (D) Galactose

35. The polysaccharide found in the exoskeleton of invertebrates is

(A) Pectin (B) Chitin
(C) Cellulose (D) Chondroitin sulphate

36. Which of the following is a heteroglycan?

(A) Dextrins (B) Agar
(C) Inulin (D) Chitin

37. The glycosaminoglycan which does not contain uronic acid is

(A) Dermatan sulphate
(B) Chondroitin sulphate
(C) Keratan sulphate
(D) Heparan sulphate

38. The glycosaminoglycan which does not contain uronic acid is

(A) Hyaluronic acid
(B) Heparin
(C) Chondroitin sulphate
(D) Dermatan sulphate

39. Keratan sulphate is found in abundance in

(A) Heart muscle (B) Liver
(C) Adrenal cortex (D) Cornea

40. Repeating units of hyaluronic acid are

(A) N-acetyl glucosamine and D-glucuronic acid
(B) N-acetyl galactosamine and D-glucuronic acid
(C) N-acetyl glucosamine and galactose
(D) N-acetyl galactosamine and L- iduronic acid

41. The approximate number of branches in amylopectin is

(A) 10 (B) 20
(C) 40 (D) 80

42. In amylopectin the intervals of glucose units of each branch is

(A) 10–20 (B) 24–30
(C) 30–40 (D) 40–50

43. A polymer of glucose synthesized by the action of leuconostoc mesenteroids in a sucrose medium is

(A) Dextrans (B) Dextrin
(C) Limit dextrin (D) Inulin

44. Glucose on reduction with sodium amalgam forms

(A) Dulcitol (B) Sorbitol
(C) Mannitol (D) Mannitol and sorbitol

45. Glucose on oxidation does not give

(A) Glycoside (B) Glucosaccharic acid
(C) Gluconic acid (D) Glucuronic acid

46. Oxidation of galactose with conc HNO_3 yields

(A) Mucic acid (B) Glucuronic acid
(C) Saccharic acid (D) Gluconic acid

47. A positive Benedict's test is not given by

(A) Sucrose (B) Lactose
(C) Maltose (D) Glucose

48. Starch is a

(A) Polysaccharide (B) Monosaccharide
(C) Disaccharide (D) None of these

49. A positive Seliwanoff's test is obtained with

(A) Glucose (B) Fructose
(C) Lactose (D) Maltose

50. Osazones are not formed with the

(A) Glucose (B) Fructose
(C) Sucrose (D) Lactose

51. The most abundant carbohydrate found in nature is

(A) Starch (B) Glycogen
(C) Cellulose (D) Chitin

52. Impaired renal function is indicated when the amount of PSP excreted in the first 15 minutes is

(A) 20% (B) 35%
(C) 40% (D) 45%

53. An early feature of renal disease is

(A) Impairment of the capacity of the tubule to perform osmotic work

(B) Decrease in maximal tubular excretory capacity
(C) Decrease in filtration factor
(D) Decrease in renal plasma flow

54. ADH test is based on the measurement of
(A) Specific gravity of urine
(B) Concentration of urea in urine
(C) Concentration of urea in blood
(D) Volume of urine in ml/minute

55. The specific gravity of urine normally ranges from
(A) 0.900–0.999 (B) 1.003–1.030
(C) 1.000–1.001 (D) 1.101–1.120

56. Specific gravity of urine increases in
(A) Diabetes mellitus
(B) Chronic glomerulonephritis
(C) Compulsive polydypsia
(D) Hypercalcemia

57. Fixation of specific gravity of urine to 1.010 is found in
(A) Diabetes insipidus
(B) Compulsive polydypsia
(C) Cystinosis
(D) Chronic glomerulonephritis

58. Addis test is the measure of
(A) Impairment of the capacity of the tubule to perform osmotic work
(B) Secretory function of liver
(C) Excretory function of liver
(D) Activity of parenchymal cells of liver

59. Number of stereoisomers of glucose is
(A) 4 (B) 8
(C) 16 (D) None of these

60. Maltose can be formed by hydrolysis of
(A) Starch (B) Dextrin
(C) Glycogen (D) All of these

61. α–D–Glucuronic acid is present in
(A) Hyaluronic acid (B) Chondroitin sulphate
(C) Heparin (D) All of these

62. Fructose is present in hydrolysate of
(A) Sucrose (B) Inulin
(C) Both of the above (D) None of these

63. A carbohydrate found in DNA is
(A) Ribose (B) Deoxyribose
(C) Ribulose (D) All of these

64. Ribulose is a these
(A) Ketotetrose (B) Aldotetrose
(C) Ketopentose (D) Aldopentose

65. A carbohydrate, commonly known as dextrose is
(A) Dextrin (B) D-Fructose
(C) D-Glucose (D) Glycogen

66. A carbohydrate found only in milk is
(A) Glucose (B) Galactose
(C) Lactose (D) Maltose

67. A carbohydrate, known commonly as invert sugar, is
(A) Fructose (B) Sucrose
(C) Glucose (D) Lactose

68. A heteropolysacchraide among the following is
(A) Inulin (B) Cellulose
(C) Heparin (D) Dextrin

69. The predominant form of glucose in solution is
(A) Acyclic form
(B) Hydrated acyclic form
(C) Glucofuranose
(D) Glucopyranose

70. An L-isomer of monosaccharide formed in human body is
(A) L-fructose (B) L-Erythrose
(C) L-Xylose (D) L-Xylulose

71. Hyaluronic acid is found in
(A) Joints (B) Brain
(C) Abdomen (D) Mouth

72. The carbon atom which becomes asymmetric when the straight chain form of monosaccharide changes into ring form is known as

(A) Anomeric carbon atom
(B) Epimeric carbon atom
(C) Isomeric carbon atom
(D) None of these

73. The smallest monosaccharide having furanose ring structure is

(A) Erythrose (B) Ribose
(C) Glucose (D) Fructose

74. Which of the following is an epimeric pair?

(A) Glucose and fructose
(B) Glucose and galactose
(C) Galactose and mannose
(D) Lactose and maltose

75. α-Glycosidic bond is present in

(A) Lactose (B) Maltose
(C) Sucrose (D) All of these

76. Branching occurs in glycogen approximately after every

(A) Five glucose units
(B) Ten glucose units
(C) Fifteen glucose units
(D) Twenty glucose units

77. N–Acetylglucosamnine is present in

(A) Hyaluronic acid (B) Chondroitin sulphate
(C) Heparin (D) All of these

78. Iodine gives a red colour with

(A) Starch (B) Dextrin
(C) Glycogen (D) Inulin

79. Amylose is a constituent of

(A) Starch (B) Cellulose
(C) Glycogen (D) None of these

80. Synovial fluid contains

(A) Heparin
(B) Hyaluronic acid
(C) Chondroitin sulphate
(D) Keratin sulphate

81. Gluconeogenesis is decreased by

(A) Glucagon (B) Epinephrine
(C) Glucocorticoids (D) Insulin

82. Lactate formed in muscles can be utilised through

(A) Rapoport-Luebeling cycle
(B) Glucose-alanine cycle
(C) Cori's cycle
(D) Citric acid cycle

83. Glucose-6-phosphatase is not present in

(A) Liver and kidneys
(B) Kidneys and muscles
(C) Kidneys and adipose tissue
(D) Muscles and adipose tissue

84. Pyruvate carboxylase is regulated by

(A) Induction (B) Repression
(C) Allosteric regulation (D) All of these

85. Fructose-2, 6-biphosphate is formed by the action of

(A) Phosphofructokinase-1
(B) Phosphofructokinase-2
(C) Fructose biphosphate isomerase
(D) Fructose-1, 6-biphosphatase

86. The highest concentrations of fructose are found in

(A) Aqueous humor (B) Vitreous humor
(C) Synovial fluid (D) Seminal fluid

87. Glucose uptake by liver cells is

(A) Energy-consuming (B) A saturable process
(C) Insulin-dependent (D) Insulin-independent

88. Renal threshold for glucose is decreased in

(A) Diabetes mellitus (B) Insulinoma
(C) Renal glycosuria (D) Alimentary glycosuria

89. Active uptake of glucose is inhibited by

(A) Ouabain (B) Phlorrizin
(C) Digoxin (D) Alloxan

90. Glucose-6-phosphatase is absent or deficient in

(A) Von Gierke's disease
(B) Pompe's disease
(C) Cori's disease
(D) McArdle's disease

91. Debranching enzyme is absent in

(A) Cori's disease
(B) Andersen's disease
(C) Von Gierke's disease
(D) Her's disease

92. McArdle's disease is due to the deficiency of

(A) Glucose-6-phosphatase
(B) Phosphofructokinase
(C) Liver phosphorylase
(D) muscle phosphorylase

93. Tautomerisation is

(A) Shift of hydrogen (B) Shift of carbon
(C) Shift of both (D) None of these

94. In essential pentosuria, urine contains

(A) D-Ribose (B) D-Xylulose
(C) L-Xylulose (D) D-Xylose

95. Action of salivary amylase on starch leads to the formation of

(A) Maltose (B) Maltotriose
(C) Both of the above (D) Neither of these

96. Congenital galactosaemia can lead to

(A) Mental retardation
(B) Premature cataract
(C) Death
(D) All of the above

97. Uridine diphosphate glucose (UDPG) is

(A) Required for metabolism of galactose
(B) Required for synthesis of glucuronic acid
(C) A substrate for glycogen synthetase
(D) All of the above

98. Catalytic activity of salivary amylase requires the presence of

(A) Chloride ions (B) Bromide ions
(C) Iodide ions (D) All of these

99. The following is actively absorbed in the intestine:

(A) Fructose (B) Mannose
(C) Galactose (D) None of these

100. An amphibolic pathway among the following is

(A) HMP shunt (B) Glycolysis
(C) Citirc acid cycle (D) Gluconeogenesis

101. Cori's cycle transfers

(A) Glucose from muscles to liver
(B) Lactate from muscles to liver
(C) Lactate from liver to muscles
(D) Pyruvate from liver to muscles

102. Excessive intake of ethanol increases the ratio:

(A) NADH : NAD^+ (B) NAD^+ : NADH
(C) $FADH_2$: FAD (D) FAD : $FADH_2$

103. Ethanol decreases gluconeogenesis by

(A) Inhibiting glucose-6-phosphatase
(B) Inhibiting PEP carboxykinase
(C) Converting NAD^+ into NADH and decreasing the availability of pyruvate
(D) Converting NAD^+ into NADH and decreasing the availability of lactate

104. Glycogenin is

(A) Uncoupler of oxidative phosphorylation
(B) Polymer of glycogen molecules
(C) Protein primer for glycogen synthesis
(D) Intermediate in glycogen breakdown

105. During starvation, ketone bodies are used as a fuel by

(A) Erythrocytes (B) Brain
(C) Liver (D) All of these

106. Animal fat is in general

(A) Poor in saturated and rich in polyunsaturated fatty acids
(B) Rich in saturated and poor in polyunsaturated fatty acids
(C) Rich in saturated and polyunsaturated fatty acids
(D) Poor in saturated and polyunsaturated fatty acids

107. In the diet of a diabetic patient, the recommended carbohydrate intake should preferably be in the form of

(A) Monosaccharides (B) Dissaccharides
(C) Polysaccharides (D) All of these

108. Obesity increases the risk of

(A) Hypertension
(B) Diabetes mellitus
(C) Cardiovascular disease
(D) All of these

109. Worldwide, the most common vitamin deficiency is that of

(A) Ascorbic acid (B) Folic acid
(C) Vitamin A (D) Vitamin D

110. Consumption of iodised salt is recommended for prevention of

(A) Hypertension (B) Hyperthyroidism
(C) Endemic goitre (D) None of these

111. Restriction of salt intake is generally recommended in

(A) Diabetes mellitus (B) Hypertension
(C) Cirrhosis of liver (D) Peptic ulcer

112. Polyuria can occur in

(A) Diabetes mellitus
(B) Diarrhoea
(C) Acute glomerulonephritis
(D) High fever

113. Normal specific gravity of urine is

(A) 1.000–1.010 (B) 1.012–1.024
(C) 1.025–1.034 (D) 1.035–1.045

114. Specific gravity of urine is raised in all of the following except

(A) Diabetes mellitus
(B) Diabetes insipidus
(C) Dehydration
(D) Acute glomerulonephritis

115. Specific gravity of urine is decreased in

(A) Diabetes mellitus
(B) Acute glomerulonephritis
(C) Diarrhoea
(D) Chronic glomerulonephritis

116. Heavy proteinuria occurs in

(A) Acute glomerulonephritis
(B) Acute pyelonephritis
(C) Nephrosclerosis
(D) Nephrotic syndrome

117. Mucopolysaccharides are

(A) Hamopolysaccharides
(B) Hetropolysaccharides
(C) Proteins
(D) Amino acids

118. Bence-Jones protein precipitates at

(A) 20°–40° C (B) 40—60° C
(C) 60°–80° C (D) 80°–100° C

119. Serum cholesterol is decreased in

(A) Endemic goitre (B) Thyrotoxicosis
(C) Myxoedema (D) Cretinism

120. The heptose ketose sugar formed as a result of chemical reaction in HMP shunt:

(A) Sedoheptulose (B) Galactoheptose
(C) Glucoheptose (D) Mannoheptose

121. The general formula for polysaccharide is

(A) $(C_6H_{12}O_6)_n$ (B) $(C_6H_{10}O_5)_n$
(C) $(C_6H_{12}O_5)_n$ (D) $(C_6H_{19}O_6)_n$

122. The number of isomers of glucose is

(A) 4 (B) 8
(C) 12 (D) 16

123. The epimers of glucose is

(A) Fructose (B) Galactose
(C) Ribose (D) Deoxyribose

124. The intermediate in hexose monophosphate shunt is

(A) D-Ribolose (B) D-Arobinose
(C) D-xylose (D) D-lyxose

125. Honey contains the hydrolytic product of

(A) Lactose (B) Maltose
(C) Inulin (D) Starch

126. On boiling Benedict's solution is not reduced by

(A) Sucrose (B) Lactose
(C) Maltose (D) Fructose

127. Glycosides are found in many

(A) Vitamins (B) Drugs
(C) Minerals (D) Nucleoproteins

128. Galactose on oxidation with conc. HNO_3 produces

(A) Gluconic acid (B) Saccharic acid
(C) Saccharo Lactone (D) Mucic acid

129. The distinguishing test between monosaccharides and dissaccharides is

(A) Bial's test (B) Selwanoff's test
(C) Barfoed's test (D) Hydrolysis test

130. Cellulose is made up of the molecules of

(A) α-glucose (B) β-glucose
(C) Both of the above (D) None of these

131. Iodine solution produces no color with

(A) Cellulose (B) Starch
(C) Dextrin (D) Glycogen

132. Glycogen structure includes a branch in between–glucose units:

(A) 6–12 (B) 8–14
(C) 6–10 (D) 12–18

133. Amylose contains glucose units

(A) 100–200 (B) 200–300
(C) 300–400 (D) 500–600

134. Each branch of amylopectin is at an interval of glucose units:

(A) 14–20 (B) 24–30
(C) 34–40 (D) 44–50

135. N-acetylneuraminic acid is an example of

(A) Sialic acid (B) Mucic acid
(C) Glucuronic acid (D) Hippuric acid

136. In place of glucuronic acid chondroitin sulphate B contains

(A) Gluconic acid (B) Gulonic acid
(C) Induronic acid (D) Sulphonic acid

137. Blood group substances consist of

(A) Lactose (B) Maltose
(C) Fructose (D) Mucose

138. The component of cartilage and cornea is

(A) Keratosulphate
(B) Chondroitin sulphate
(C) Cadmium sulphate
(D) Antimony sulphate

139. Benedict's test is less likely to give weakly positive results with concentrated urine due to the action of

(A) Urea (B) Uric acid
(C) Ammonium salts (D) Phosphates

140. Active transport of sugar is depressed by the agent:

(A) Oxaloacetate (B) Fumarate
(C) Malonate (D) Succinate

141. The general test for detection of carbohydrates is

(A) Iodine test (B) Molisch test
(C) Barfoed test (D) Osazone test

142. Glucose absorption may be decreased in

(A) Oedema (B) Nephritis
(C) Rickets (D) Osteomalitis

143. Glycogen synthetase activity is depressed by

(A) Glucose (B) Insulin
(C) Cyclic AMP (D) Fructokinase

144. The branching enzyme acts on the glycogen when the glycogen chain has been lengthened to between glucose units:

(A) 1 and 6 (B) 2 and 7
(C) 3 and 9 (D) 6 and 11

145. Cyclic AMP is formed from ATP by the enzyme adenylate cyclase which is activated by the hormone:

(A) Insulin (B) Epinephrine
(C) Testosterone (D) Progesterone

146. Hexokinase has a high affinity for glucose than

(A) Fructokinase (B) Galactokinase
(C) Glucokinase (D) All of the above

147. Dihydroxyacetone phosphate and glyceraldehyde-3-phosphate are intercoverted by

(A) Triose isomerase
(B) Phosphotriose isomerase
(C) Diphosphotriose isomerase
(D) Dihydroxyacetone phosphorylase

148. Citrate is converted to isocitrate by aconitase which contains

(A) Ca^{++} (B) Fe^{++}
(C) Zn^{++} (D) Mg^{++}

149. The reaction succinyl COA to succinate requires

(A) CDP (B) ADP
(C) GDP (D) $NADP^{+}$

150. The carrier of the citric acid cycle is

(A) Succinate (B) Fumarate
(C) Malate (D) Oxaloacetate

151. UDPG is oxidized to UDP glucuronic acid by UDP dehydrogenase in presence of

(A) FAD^{+} (B) NAD^{+}
(C) $NADP^{+}$ (D) ADP^{+}

152. Galactose is phosphorylated by galactokinase to form

(A) Galactose-6-phosphate
(B) Galactose-1, 6 diphosphate
(C) Galactose-1-phosphate
(D) All of these

153. The conversion of alanine to glucose is termed

(A) Glycolysis
(B) Oxidative decarboxylation
(C) Specific dynamic action
(D) Gluconeogenesis

154. The blood sugar raising action of the hormones of suprarenal cortex is due to

(A) Gluconeogenesis
(B) Glycogenolysis
(C) Glucagon-like activity
(D) Due to inhibition of glomerular filtration

155. Under anaerobic conditions the glycolysis one mole of glucose yields __ moles of ATP.

(A) One (B) Two
(C) Eight (D) Thirty

156. Which of the following metabolite integrates glucose and fatty acid metabolism?

(A) Acetyl CoA (B) Pyruvate
(C) Citrate (D) Lactate

157. Cerebrosides consist of mostly of this sugar:

(A) Glucose (B) Fructose
(C) Galactose (D) Arabinose

158. Glucose will be converted into fatty acids if the diet has excess of

(A) Carbohydrates (B) Proteins
(C) Fat (D) Vitamins

159. The purple ring of Molisch reaction is due to

(A) Furfural
(B) Furfural + α Napthol
(C) °C Napthol
(D) Furfurol + H_2SO_4 + α -Naphthol

160. One of the following enzymes does not change glycogen synthase a to b.

(A) Glycogen synthase kinases 3, 4, 5
(B) Ca^{2+} calmodulin phosphorylase kinase
(C) Ca^{2+} calmodulin dependent protein kinase
(D) Glycogen phosphorylase a

161. In EM pathway-2-phosphoglycerate is converted to

(A) Phospho enol pyruvate
(B) Enol pyruvate
(C) Di hydroxy acetone phosphate (DHAP)
(D) 1,3 bisphosphoglycerate

162. An aneplerotic reaction which sustains the availability of oxaloacetate is the carboxylation of

(A) Glutamate (B) Pyruvate
(C) Citrate (D) Succinate

163. Specific test for ketohexoses:

(A) Seliwanoff's test (B) Osazone test
(C) Molisch test (D) None of these

164. Two important byproducts of HMP shunt are

(A) NADH and pentose sugars
(B) NADPH and pentose sugars

(C) Pentose sugars and 4 membered sugars
(D) Pentose sugars and sedoheptulose

165. Pyruvate dehydrogenase complex and α-ketoglutarate dehydrogenase complex require the following for their oxidative decarboxylation:

(A) COASH and Lipoic acid
(B) NAD^+ and FAD
(C) COASH and TPP
(D) COASH, TPP,NAD^+,FAD, Lipoate

166. The four membered aldose sugar phosphate formed in HMP shunt pathway is

(A) Xylulose P (B) Erythrulose P
(C) Erythrose P (D) Ribulose P

167. Cane sugar (Sucrose) injected into blood is

(A) changed to fructose
(B) changed to glucose
(C) undergoes no significant change
(D) changed to glucose and fructose

168. Pentose production is increased in

(A) HMP shunt
(B) Uromic acid pathway
(C) EM pathway
(D) TCA cycle

169. Conversion of Alanine to carbohydrate is termed:

(A) Glycogenesis (B) Gluconeogenesis
(C) Glycogenolysis (D) Photosynthesis

170. The following is an enzyme required for glycolysis:

(A) Pyruvate kinase
(B) Pyruvate carboxylase
(C) Glucose-6-phosphatase
(D) Glycerokinase

171. Our body can get pentoses from

(A) Glycolytic pathway
(B) Uromic acid pathway
(C) TCA cycle
(D) HMP shunt

172. Conversion of glucose to glucose-6-phosphate in human liver is by

(A) Hexokinase only
(B) Glucokinase only
(C) Hexokinase and glucokinase
(D) Glucose-6-phosphate dehydrogenase

173. The following is an enzyme required for glycolysis:

(A) Pyruvate kinase
(B) Pyruvate carboxylase
(C) Glucose-6-phosphatose
(D) Glycerokinase

174. The normal glucose tolerance curve reaches peak is

(A) 15 min (B) 1 hr
(C) 2 hrs (D) 2½ hrs

175. Oxidative decarboxylation of pyruvate requires

(A) $NADP^+$
(B) Cytichromes
(C) pyridoxal phosphate
(D) COASH

176. Glucose tolerance is increased in

(A) Diabetes mellitus (B) Adrenalectomy
(C) Acromegaly (D) Thyrotoxicosis

177. Glucose tolerance is decreased in

(A) Diabetes mellitus (B) Hypopituitarisme
(C) Addison's disease (D) Hypothyroidism

178. During glycolysis, Fructose 1,6 diphosphate is decomposed by the enzyme:

(A) Enolase a
(B) Fructokinase
(C) Aldolase
(D) Diphosphofructophosphatose

179. The following enzyme is required for the hexose monophosphate shunt pathway:

(A) Glucose-6-phosphatase
(B) Phosphorylase
(C) Aldolase
(D) Glucose-6-phosphate dehydrogenase

180 Dehydrogenase enzymes of the hexose monophosphate shunt are

(A) NAD^+ specific (B) $NADP^+$ specific
(C) FAD specific (D) FMN specific

181. Under anaerobic conditions the glycolysis of one mole of glucose yields _____moles of ATP.

(A) One (B) Two
(C) Eight (D) Thirty

182. Glycogen is converted to glucose-1-phosphate by

(A) UDPG transferase (B) Branching enzyme
(C) Phosphorylase (D) Phosphatase

183. Which of the following is not an enzyme involved in glycolysis?

(A) Euolase (B) Aldolose
(C) Hexokinase (D) Glucose oxidase

184. Tricarboxylic acid cycle to be continuous requires the regeneration of

(A) Pyruvic acid (B) oxaloacetic acid
(C) α-oxoglutaric acid (D) Malic acid

185. Dehydrogenation of succinic acid to fumaric acid requires the following hydrogen carrier:

(A) NAD^+ (B) $NADP^+$
(C) flavoprotein (D) Glutathione

186. The tissues with the highest total glycogen content are

(A) Muscle and kidneys
(B) Kidneys and liver
(C) Liver and muscle
(D) Brain and Liver

187. Rothera test is not given by

(A) β-hydroxy butyrate (B) bile salts
(C) Glucose (D) None of these

188. Gluconeogenesis is increased in the following condition:

(A) Diabetes insipidus (B) Diabetes Mellitus
(C) Hypothyroidism (D) Liver diseases

189. The oxidation of lactic acid to pyruvic acid requires the following vitamin derivative as the hydrogen carrier.

(A) Lithium pyrophosphate
(B) Coenyzme A
(C) NAD^+
(D) FMN

190. Physiological glycosuria is met with in

(A) Renal glycosuria
(B) Alimentary glycosuria
(C) Diabetes Mellitus
(D) Alloxan diabetes

191. Two examples of substrate level phosphorylation in EM pathway of glucose metabolism are in the reactions of

(A) 1,3 bisphosphoglycerate and phosphoenol pyruvate
(B) Glucose-6 phosphate and Fructo-6-phosphate
(C) 3 phosphoglyceraldehyde and phosphoenolpyruvate
(D) 1,3 diphosphoglycerate and 2-phosphoglycerate

192. The number of molecules of ATP produced by the total oxidation of acetyl CoA in TCA cycle is

(A) 6 (B) 8
(C) 10 (D) 12

193. Substrate level phosphorylation in TCA cycle is in step:

(A) Isocitrate dehydrogenase
(B) Malate dehydrogenase
(C) Aconitase
(D) Succinate thiokinase

194. Fatty acids cannot be converted into carbohydrates in the body as the following reaction is not possible.

(A) Conversion of glucose-6-phosphate into glucose
(B) Fructose 1,6-bisphosphate to fructose-6-phosphate
(C) Transformation of acetyl CoA to pyruvate
(D) Formation of acetyl CoA from fatty acids

195. Tissues form lactic acid from glucose. This phenomenon is termed as

(A) Aerobic glycolysis
(B) Oxidation
(C) Oxidative phosphorylation
(D) Anaerobic glycolysis

196. One molecule of glucose gives _____ molecules of CO_2 in EM-TCA cycle.

(A) 6 (B) 3
(C) 1 (D) 2

197. One molecule of glucose gives _____ molecules of CO_2 in one round of HMP shunt.

(A) 6 (B) 1
(C) 2 (D) 3

198. The 4 rate limiting enzymes of gluconeogenesis are

(A) Glucokinase, Pyruvate carboxylae phosphoenol pyruvate carboxykinase and glucose-6-phosphatase
(B) Pyruvate carboxylase, phosphoenol pyruvate carboxykinase, fructose1,6 diphosphatase and glucose-6-phosphatase
(C) Pyruvate kinase, pyruvate carboxylase, phosphoenol pyruvate carboxykinase and glucose-6-phosphatase
(D) Phospho fructokinase, pyruvate carboxylase, phosphoenol pyruvate carboxykinase and fructose 1, 6 diphosphatase

199. For glycogenesis, Glucose should be converted to

(A) Glucuronic acid (B) Pyruvic acid
(C) UDP glucose (D) Sorbitol

200. Fluoride inhibits _____ and arrests glycolysis.

(A) Glyceraldehyde-3-phosphate dehydrogenase
(B) Aconitase
(C) Enolose
(D) Succinate dehydrogenase

201. One of the following statement is correct:

(A) Glycogen synthase 'a' is the phosphorylated
(B) cAMP converts glycogen synthase b to 'a'
(C) Insulin converts glycogen synthase b to a
(D) UDP glucose molecules interact and grow into a Glycogen tree

202. Amylo 1, 6 glucosidase is called

(A) Branching enzyme
(B) debranching enzyme
(C) Glucantransferase
(D) Phosphorylase

203. Glucose enters the cells by

(A) insulin independent transport
(B) insulin dependent transport
(C) enzyme mediated transport
(D) Both (A) and (B)

204. Glycogen while being acted upon by active phosphorylase is converted first to

(A) Glucose
(B) Glucose 1-phosphate and Glycogen with 1 carbon less
(C) Glucose-6-phosphate and Glycogen with 1 carbon less
(D) 6-Phosphogluconic acid

205. When O_2 supply is inadequate, pyruvate is converted to

(A) Phosphopyruvate (B) Acetyl CoA
(C) Lactate (D) Alanine

206. Reactivation of inactive liver phosphorylase is normally favoured by

(A) Insulin (B) Epinephrine
(C) ACTH (D) Glucagon

207. Before pyruvic acid enters the TCA cycle it must be converted to

(A) Acetyl CoA (B) Lactate
(C) α-ketoglutarate (D) Citrate

208. The hydrolysis of Glucose-6-phosphate is catalysed by a specific phosphatase which is found only in

(A) Liver, intestines and kidneys
(B) Brain, spleen and adrenals
(C) Striated muscle
(D) Plasma

209. The formation of citrate from oxalo acetate and acetyl CoA is

(A) Oxidation (B) Reduction
(C) Condensation (D) Hydrolysis

210. Which one of the following is a rate limiting enzyme of gluconeogenesis?

(A) Hexokinase
(B) Phsophofructokinase
(C) Pyruvate carboxylase
(D) Pyruvate kinase

211. The number of ATP produced in the succinate dehydrogenase step is

(A) 1 (B) 2
(C) 3 (D) 4

212. Which of the following reaction gives lactose?

(A) UDP galactose and glucose
(B) UDP glucose and galactose
(C) Glucose and Galactose
(D) Glucose, Galactose and UTP

213. UDP Glucuronic acid is required for the biosynthesis of

(A) Chondroitin sulphates
(B) Glycogen
(C) Lactose
(D) Starch

214. Which one of the following can covert glucose to vitamin C?

(A) Albino rats (B) Humans
(C) Monkeys (D) Guinea pigs

215. Which one of the following cannot convert glucose to Vitamin C?

(A) Albino rats (B) Dogs
(C) Monkeys (D) Cows

216. Transketolase has the coenzyme:

(A) NAD^+ (B) FP
(C) TPP (D) Pyridoxol phosphate

217. Two conditions in which gluconeogenesis is increased are

(A) Diabetes mellitus and atherosclerosis
(B) Fed condition and thyrotoxicosis
(C) Diabetes mellitus and Starvation
(D) Alcohol intake and cigarette smoking

218. Acetyl CoA is not used for the synthesis of

(A) Fatty acid (B) Cholesterol
(C) Pyruvic acid (D) Citric acid

219. The total glycogen content of the body is about _____ gms.

(A) 100 (B) 200
(C) 300 (D) 500

220. The total Glucose in the body is _____ gms.

(A) 10–15 (B) 20–30
(C) 40–50 (D) 60–80

221. Pyruvate kinase requires _____ ions for maximum activity.

(A) Na^+ (B) K^+
(C) $Ca2^+$ (D) $Mg2^+$

222. ATP is 'wasted' in Rapoport-Lueberring cycle in RBCs as otherwise it will inhibit

(A) Phosphoglucomutase
(B) Phosphohexo isomerase
(C) Phosphofructo kinase
(D) Phosphoenol pyruvate carboxy kinase

223. The following co-enzyme is needed for the oxidative decarboxylation of ketoacids:

(A) $NADP^+$ (B) TPP
(C) Folate coenzyme (D) Biotin coenzyme

224. Synthesis of Glucose from amino acids is termed as

(A) Glycolysis (B) Gluconeogenesis
(C) Glycogenesis (D) Lipogenesis

225. The following examples are important heteropolysaccharides except

(A) Amylopectin (B) Heparin
(C) Peptidoglycan (D) Hyaluronic acid

226. Whcih of the following features are common to monosaccharides?

(A) Contain asymmetric centres
(B) Are of 2 types – aldoses and ketoses
(C) Tend to exist as ring structures in solution
(D) Include glucose, galactose and raffinose

227. Polysaccharides

(A) Contain many monosaccharide units which may or may not be of the same kind
(B) Function mainly a storage or structural compounds
(C) Are present in large amounts in connective tissue
(D) All of these

228. The absorption of glucose in the digestive tract

(A) Occurs in the small intestine
(B) Is stimulated by the hormone Glucagon
(C) Occurs more rapidly than the absorption of any other sugar
(D) Is impaired in cases of diabetes mellitus

229. UDP-Glucose is converted to UDP-Glucuronic acid by

(A) ATP (B) GTP
(C) $NADP^+$ (D) NAD^+

230. The enzymes involved in Phosphorylation of glucose to glucose 6- phosphate are

(A) Hexokinase
(B) Glucokinase
(C) Phosphofructokinase
(D) Both (A) and (B)

231. In conversion of Lactic acid to Glucose, three reactions of Glycolytic pathway are circumvented, which of the following enzymes do not participate?

(A) Pyruvate Carboxylase
(B) Phosphoenol pyruvate carboxy kinase
(C) Pyruvate kinase
(D) Glucose-6-phosphatase

232. The normal resting state of humans, most of the blood glucose burnt as "fuel" is consumed by

(A) Liver (B) Brain
(C) Kidneys (D) Adipose tissue

233. A regulator of the enzyme Glycogen synthase is

(A) Citric acid
(B) 2, 3 bisphosphoglycerate
(C) Pyruvate
(D) GTP

234. Which of the following compound is a positive allosteric modifier of the enzyme pyruvate carboxylase?

(A) Biotin (B) Acetyl CoA
(C) Oxaloacetate (D) ATP

235. A specific inhibitor for succinate dehydrogenase is

(A) Arsinite (B) Melouate
(C) Citrate (D) Cyanide

236. Most of the metabolic pathways are either anabolic or catabolic. Which of the following pathways is considered as "amphibolic" in nature?

(A) Glycogenesis (B) Glycolytic pathway
(C) Lipolysis (D) TCA cycle

237. Transketolase activity is affected in

(A) Biotin deficiency
(B) Pyridoxine deficiency
(C) PABA deficiency
(D) Thiamine deficiency

238. The following metabolic abnormalities occur in Diabetes mellitus except

(A) Increased plasma FFA
(B) Increased pyruvate carboxylase activate
(C) Decreased lipogenesis
(D) Decreased gluconeogenesis

239. A substance that is not an intermediate in the formation of D-glucuronic acid from glucose is

(A) Glucoss-1-p
(B) 6-Phosphogluconate
(C) Glucose-6-p
(D) UDP-Glucose

240. The hydrolysis of Glucose-6-P is catalysed by a phosphatase that is not formed in which of the following?

(A) Liver (B) Kidney
(C) Muscle (D) Small intestine

241. An essential for converting Glucose to Glycogen in Liver is

(A) Lactic acid (B) GTP
(C) CTP (D) UTP

242. Which of the following is a substrate for aldolase activity in Glycolytic pathway?

(A) Glyceraldehyde-3-p
(B) Glucose-6-p
(C) Fructose-6-p
(D) Fructose1, 6-bisphosphate

243. The ratio that approximates the number of net molecule of ATP formed per mole of Glucose oxidized in presence of O_2 to the net number formed in abscence of O_2 is

(A) 4 : 1 (B) 10 : 2
(C) 12 : 1 (D) 18 : 1

244. The "Primaquin sensitivity types of haemolytic anaemia has been found to relate to reduced R.B.C activity of which enzyme?

(A) Pyruvate kinase deficiency
(B) Glucose-6-phosphatase deficiency
(C) Glucose-6-p dehydrogenase deficiency
(D) Hexokinase deficiency

245. Which of the following hormones is not involved in carbohydrate metabolism?

(A) Cortisol (B) ACTH
(C) Glucogen (D) Vasopressin

246. Dehydrogenases involved in HMP shunt are specific for

(A) $NADP^+$ (B) NAD^+
(C) FAD (D) FMN

247. Which of the following enzymes in Glycolytic pathway is inhibited by fluoride?

(A) Glyceraldehyde-3-p dehydrogenase
(B) Phosphoglycerate kinase
(C) Pyruvate kinase
(D) Enolase

248. Out of 24 mols of ATP formed in TCA cycle, 2 molecules of ATP can be formed at "substrate level" by which of the following reaction ?

(A) Citric acid→ Isocitric acid
(B) Isocitrate→ Oxaloacetate
(C) Succinic acid→ Fumarate
(D) Succinylcat→ Succinic acid

249. Which of the following statements regarding T.C.A cycle is true?

(A) It is an anaerobic process
(B) It occurs in cytosol
(C) It contains no intermediates for Gluconeogenesis
(D) It is amphibolic in nature

250. An allosteric enzyme responsible for controlling the rate of T.C.A cycle is

(A) Malate dehydrogenase
(B) Isocitrate dehydrogenase
(C) Fumarase
(D) Aconitase

251. The glycolysis is regulated by

(A) Hexokinase (B) Phosphofructokinase
(C) Pyruvate kinase (D) All of these

252. How many ATP molecules will be required for conversion of 2-molecules of Lactic acid to Glucose?

(A) 2 (B) 4
(C) 8 (D) 6

253. Which of the following enzyme is not involved in HMP shunt?

(A) Glyceraldehyde-3-p dehydrogenase
(B) Glucose-6-p-dehydrogenase
(C) Transketolase
(D) Phosphogluconate dehydrogenase

254. In presence of the following cofactor, pyruvate carboxylase converts pyruvate to oxaloacetate:

(A) ATP, Protein and CO_2
(B) CO_2 and ATP
(C) CO_2
(D) Protein

255. For conversion of oxaloacetate to phosphoenol pyruvate, high energy molecule is required in the form of

(A) GTP only (B) ITP only
(C) GTP (or) ITP (D) None of these

256. If the more negative standard reduction potential of a redox pair, the greater the tendency to

(A) To lose electrons
(B) To gain electrons
(C) To lose/gain electrons
(D) To lose and gain electrons

257. Electron transport and phosphorylation can be uncoupled by compounds that increase the permeability of the inner mitochondrial membrane to

(A) Electrons (B) Protons
(C) Uncouplers (D) All of these

258. The more positive the E_0, the greater the tendency of the oxidant member of that pair to

(A) Lose electrons
(B) Gain electrons
(C) Lose (or) gain electrons
(D) Lose and gain electrons

259. The standard free energy of hydrolysis of terminal phosphate group of ATP is

(A) –7,300 cal/mol (B) –8,300 cal/mol
(C) 10,000 cal/mol (D) +7,300 cal/mol

260. The transport of a pair of electrons from NADH to O_2 via the electron transport chain produces

(A) –52,580 cal (B) –50,580 cal
(C) 21,900 cal (D) +52,580 cal

261. Sufficient energy required to produce 3 ATP from 3 ADP and 3 pi is

(A) –21,900 cal (B) 29,900 cal
(C) 31,900 cal (D) 39,900 cal

262. The free energy change, AG

(A) Is directly proportional to the standard free energy change, AG
(B) Is equal to zero at equilibrium
(C) Can only be calculated when the reactants and products are present at 1mol/1 concentrations
(D) Is equal to –RT in keq

263. Under standard conditions

(A) The free energy change $\Delta G°$, is equal to 0
(B) The standard free energy change ΔG, is equal to 0
(C) The free energy change, $\Delta G°$, is equal to the standard free energy change, $\Delta G°$
(D) Keq is equal to 1

264. An uncoupler of oxidative phosphorylation such as dinitrophenol

(A) Inhibits electron transport and ATP synthesis
(B) Allow electron transport to proceed without ATP synthesis
(C) Inhibits electron transport without impairment of ATP synthesis
(D) Specially inhibits cytochrome b

265. All of the following statements about the enzymic complex that carries out the synthesis of ATP during oxidative phosphorylation are correct except

(A) It is located on the matrix side of the inner mitochondrial membrane
(B) It is inhibited by oligomycin
(C) It can exhibit ATPase activity
(D) It can bind molecular O_2

266. Glucokinase

(A) Is widely distributed and occurs in most mammalian tissues
(B) Has a high k_m for glucose and hence is important in the phosphorylation of glucose primarily after ingestion of a carbohydrate rich meal
(C) Is widely distributed in Prokaryotes
(D) None of these

267. The reaction catalysed by phosphofructokinase

(A) Is activated by high concentrations of ATP and citrate
(B) Uses fruitose-1-phosphate as substrate
(C) Is the rate-limiting reaction of the glycolytic pathway
(D) Is inhibited by fructose 2, 6-bisphosphate

268. Compared to the resting state, vigorously contracting muscle shows

(A) An increased conversion of pyruvate to lactate
(B) Decreased oxidation of pyruvate of CO_2 and water
(C) A decreased NADH/NAD^+ ratio
(D) Decreased concentration of AMP

269. Which one of the following would be expected in pyruvate kinase deficiency?

(A) Increased levels of lactate in the R.B.C
(B) Hemolytic anemia
(C) Decreased ratio of ADP to ATP in R.B.C
(D) Increased phosphorylation of Glucose to Glucose-6-phosphate

270. Which one of the following statements concerning glucose metabolism is correct?

(A) The conversion of Glucose to lactate occurs only in the R.B.C
(B) Glucose enters most cells by a mechanism in which Na^+ and glucose are co-transported
(C) Pyruvate kinase catalyses an irreversible reaction
(D) An elevated level of insulin leads to a decreased level of fructose 2, 6-bisphosphate in hepatocyte

271. Which one of the following compounds cannot give rise to the net synthesis of Glucose?

(A) Lactate (B) Glycerol
(C) α-ketoglutarate (D) Acetyl CoA

272. Which of the following reactions is unique to gluconeogenesis?

(A) Lactate Pyruvate
(B) Phosphoenol pyruvate pyruvate
(C) Oxaloacetate phosphoenol pyruvate
(D) Glucose-6-phosphate Fructose-6-phosphate

273. The synthesis of glucose from pyruvate by gluconeogenesis

(A) Requires the participation of biotin
(B) Occurs exclusively in the cytosol
(C) Is inhibited by elevated level of insulin
(D) Requires oxidation/reduction of FAD

274. The conversion of pyruvate to acetyl CoA and CO_2

(A) Is reversible
(B) Involves the participation of lipoic acid
(C) Depends on the coenzyme biotin
(D) Occurs in the cytosol

275. Pasteur effect is

(A) Inhibition of glycolysis
(B) Oxygen is involved
(C) Inhibition of enzyme phosphofructokinase
(D) All of these

276. How many ATPs are produced in the conversion of phosphoenol pyruvate to citrate?

(A) 1 (B) 2
(C) 4 (D) 6

277. Reduced glutathione functions in R.B.Cs to

(A) Produce NADPH
(B) Reduce methemoglobin to hemoglobin
(C) Produce NADH
(D) Reduce oxidizing agents such as H_2O_2

278. Phenylalanine is the precursor of

(A) L-DOPA (B) Histamine
(C) Tyrosine (D) Throxine

279. D-Mannose is present in some plant products like

(A) Resins (B) Pectins
(C) Mucilage (D) Gums

280. Galactose is a main constituent of

(A) Milk sugar (B) Honey
(C) Cane sugar (D) Chitin

281. Glucosamine is an important constituent of

(A) Homopolysaccharide
(B) Heteropolysaccharide
(C) Mucopolysaccharide
(D) Dextran

282. Glycogen is present in all body tissues except

(A) Liver (B) Brain
(C) Kidney (D) Stomach

283. Iodine test is positive for starch, dextrin and

(A) Mucoproteins (B) Agar
(C) Glycogen (D) Cellulose

284. The general formula for polysaccharide is

(A) $(C_6H_{10}O_5)_n$ (B) $(C_6H_{12}C_6)_n$
(C) $(C_6H_{12}O_5)_n$ (D) $(C_5H_{10}O_5)_n$

285. Epimers of glucose is

(A) Fructose (B) Galactose
(C) Ribose (D) Deoxyribose

286. Human heart muscle contains

(A) D-Arabinose (B) D-Ribose
(C) D-Xylose (D) L-Xylose

287. The intermediate n hexose monophosphate shunt is

(A) D-Ribulose (B) D-Arabinose
(C) D-xylose (D) D-Lyxose

288. On boiling Benedict's solution is not reduced by

(A) Sucrose (B) Lactose
(C) Maltose (D) Fructose

289. The distinguishing test between monosaccharides and dissaccharide is

(A) Bial's test (B) Seliwanoff's test
(C) Barfoed's test (D) Hydrolysis test

290. Barfoed's solution is not reduced by

(A) Glucose (B) Mannose
(C) Sucrose (D) Ribose

291. Cori cycle is

(A) Synthesis of glucose
(B) reuse of glucose
(C) uptake of glycose
(D) Both (A) & (B)

292. Cane sugar is known as

(A) Galactose (B) Sucrose
(C) Fructose (D) Maltose

293. Which of the following is not reducing sugar?

(A) Lactose (B) Maltose
(C) Sucrose (D) Fructose

294. α–D-Glucose and β–D-glucose are related by

(A) Epimers (B) Anomers
(C) Multirotation (D) Ketoenol pair

295. The stable ring formation in D-Glucose involves

(A) C-1 and C-4 (B) C-1 and C-2
(C) C-1 and C-5 (D) C-2 and C-5

296. Reduction of Glucose with Ca^{++} in water produces

(A) Sorbitol (B) Dulcitol
(C) Mannitol (D) Glucuronic acid

297. Starch and glycogen are polymers of

(A) Fructose (B) Mannose
(C) α–D-Glucose (D) Galactose

298. Reducing ability of carbohydrates is due to

(A) Carboxyl group (B) Hydroxyl group
(C) Enediol formation (D) Ring structure

299. Which of the following is not a polymer of glucose?

(A) Amylose (B) Inulin
(C) Cellulose (D) Dextrin

300. Invert sugar is

(A) Lactose
(B) Mannose
(C) Fructose
(D) Hydrolytic product of sucrose

301 The carbohydrate reserved in human body is

(A) Starch (B) Glucose
(C) Glycogen (D) Inulin

302 A dissaccharide linked by α-1-4 Glycosideic linkages is

(A) Lactose (B) Sucrose
(C) Cellulose (D) Maltose

ANSWERS

1. A	2. A	3. A	4. A	5. B	6. A
7. A	8. D	9. A	10. A	11. A	12. C
13. B	14. A	15. A	16. B	17. A	18. A
19. C	20. C	21. A	22. D	23. C	24. B
25. A	26. D	27. C	28. C	29. B	30. B
31. D	32. A	33. C	34. B	35. B	36. B
37. C	38. B	39. D	40. A	41. D	42. B
43. A	44. B	45. A	46. A	47. A	48. A
49. B	50. C	51. C	52. A	53. A	54. A
55. B	56. A	57. D	58. A	59. C	60. D
61. C	62. C	63. B	64. C	65. C	66. C
67. B	68. C	69. D	70. D	71. A	72. A
73. B	74. B	75. B	76. B	77. A	78. C
79. A	80. B	81. D	82. C	83. D	84. D
85. B	86. D	87. D	88. C	89. B	90. A
91. A	92. D	93. A	94. C	95. C	96. D
97. D	98. A	99. C	100. C	101. B	102. A
103. C	104. C	105. B	106. B	107. C	108. D
109. B	110. C	111. B	112. B	113. B	114. D
115. B	116. B	117. A	118. B	119. B	120. A
121. B	122. D	123. B	124. A	125. C	126. A
127. B	128. D	129. C	130. A	131. A	132. D
133. C	134. B	135. C	136. C	137. C	138. A
139. B	140. C	141. B	142. A	143. C	144. D
145. B	146. C	147. B	148. B	149. B	150. D
151. B	152. C	153. D	154. A	155. B	156. A
157. C	158. A	159. B	160. D	161. A	162. B
163. A	164. B	165. D	166. C	167. C	168. A
169. B	170. A	171. D	172. C	173. A	174. B
175. D	176. B	177. A	178. C	179. D	180. B
181. B	182. C	183. D	184. B	185. C	186. C
187. A	188. B	189. C	190. B	191. A	192. D
193. D	194. C	195. D	196. A	197. B	198. B
199. C	200. C	201. C	202. B	203. D	204. C
205. C	206. D	207. A	208. A	209. C	210. C
211. B	212. A	213. A	214. A	215. C	216. C
217. C	218. C	219. C	220. B	221. B	222.C
223. B	224. B	225. A	226. C	227. D	228. A
229. B	230. D	231. C	232. B	233. C	234. A
235. B	236. D	237. B	238. B	239. B	240. C
241. D	242. D	243. B	244. C	245. D	246. A
247. D	248. D	249. D	250. B	251. D	252. D

253. A	254. A	255. C	256. A	257. B	258. B
259. A	260. D	261. A	262. B	263. C	264. B
265. D	266. B	267. C	268. A	269. B	270. C
271. B	272. C	273. A	274. B	275. D	276. C
277. D	278. C	279. D	280. A	281. C	282. B
283. C	284. A	285. B	286. C	287. A	288. A
289. C	290. C	291. D	292. B	293. C	294. B
295. C	296. A	297. C	298. A	299. B	300. D
301. C	302. D				

EXPLANATIONS FOR THE ANSWERS

7. A Polysaccharides are polymers of monosaccharides. They are of two types– hompolysaccharides that contain a single type of monosaccharide (*e.g.*, starch, insulin, cellulose) and heteropolysaccharides with two or more different types of monosaccharides (*e.g.*, heparin, chondroitin sulfate).

30. B Mutorotation refers to the change in the specific optical rotation representing the interconversion of α- and β- anomers of D-glucose to an equilibrium.

48. A Starch is a polysaccharide composed of D-glucose units held together by α-glycosidic bonds, (α 1$\rightarrow$ 4 linkages; at branching points α 1$\rightarrow$ 6 linkages).

71. A Hyaluronic acid is the ground substance of synovial fluid of joints. It serves as lubricants and shock absorbant in joints.

93. A The process of shifting a hydrogen atom from one carbon to another to produce enediols is referred to as tautomerization.

117. A Mucopolysaccharides (commonly known as glycosaminoglycans) are heteropolysaccharides composed of sugar derivatives (mainly amino sugars and uronic acids). The important mucopolysaccharides include hyaluronic acid, heparin, chondroitin sulfate, dermatan sulfate and keratan sulfate.

141. B *Molisch test:* It is a general test for the detection of carbohydrates. The strong H_2SO_4 hydrolyses carbohydrates (poly- and disaccharides) to liberate monosaccharides. The monosaccharides get dehydrated to form furfural (from pentoses) or hydroxy methylfurfural (from hexoses) which condense with α-naphthol to form a violet coloured complex.

163. A *Seliwanoff's test:* this is a specific test for ketohexoses. Concentrated hydrochloric acid dehydrates ketohexoses to form furfural derivatives which condense with resorcinol to give a cherry red complex.

187. A *Rothera's test:* Nitroprosside in alkaline medium reacts with keto group of ketone bodies (acetone and acetoacetate) to form a purple ring. This test is not given by β-hydroxybutyrate.

203. D Two specific transport systems are recognized for the entry of glucose into the cells.

(a) *Insulin-independent transport:* This is a carrier mediated uptake of glucose which is not dependent on the hormone inslulin. This operates in hepatocytes, erythrocytes and brain.

(b) *Insulin-dependent transport:* This occurs in muscle and adipose tissue.

230. D Hexokinase and glucokinase are involved in the phosphorylation of glucose to glucose 6-phosphate. The enzyme hexokinase, present in almost all the tissues, catalyses the phosphorylation of other hexose also (fructose, mannose). It has low K_m for substrates (about 0.1 mM) and is inhibited by glucose 6-phosphate. In contrast, glucokinase is present in liver, catalyses the phosphorylation of only glucose, has high K_m for glucose (10 mM)

and is not inhibited by glucose 6-phosphate.

251. D The three enzymes namely hexokinase (or glucokinase), phosphofructokinase and pyruvate kinase, catalyzing the irreversible reactions regulate glycolysis. Among these, phosphofructokinase is the most regulatory. It is an allosteric enzyme inhibited by ATP, citrate and activated by AMP and Pi.

275. D The inhibition of glycolysis by oxygen is referred to as Pasteur effect. This is due to inhibition of the enzyme phosphofructokinase by ATP and citrate (formed in the presence of O_2)

291. D The cycle involving the synthesis of glucose in liver from the skeletal muscle lactate and the reuse of glucose thus synthesized by the muscle for energy purposes is known as Cori Cycle.